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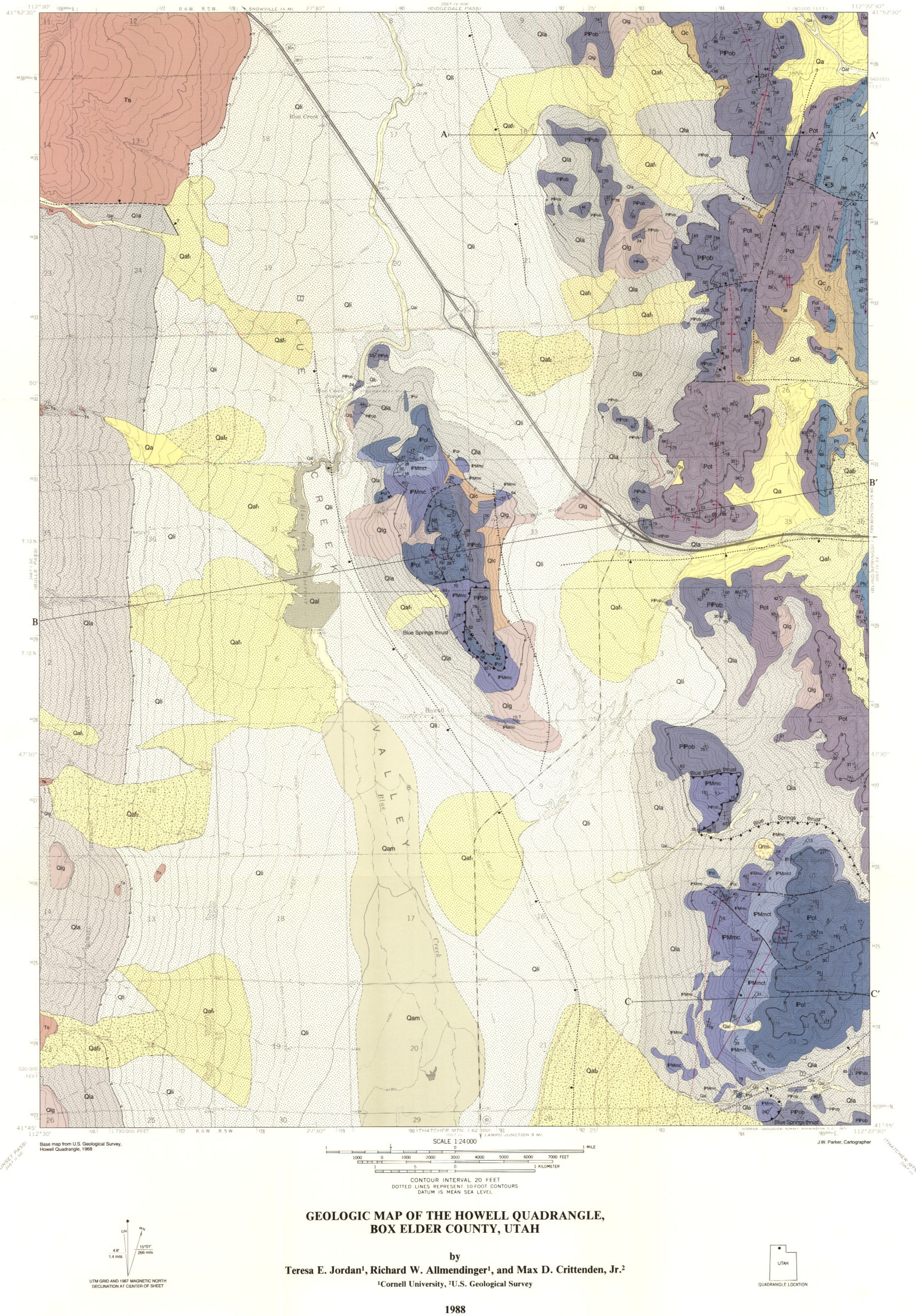
Plate 1
Utah Geological and Mineral Survey Map 107
Geologic Map of the Howell Quadrangle



Base map from U.S. Geological Survey,
Howell Quadrangle, 1968

J.W. Parker, Cartographer

SCALE 1:24 000

1 MILE
7000 FEET
1 KILOMETER

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 10-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1987 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

GEOLOGIC MAP OF THE HOWELL QUADRANGLE, BOX ELDER COUNTY, UTAH

by

Teresa E. Jordan[1], Richard W. Allmendinger[1], and Max D. Crittenden, Jr.[2]

[1]Cornell University, [2]U.S. Geological Survey

QUADRANGLE LOCATION

1988

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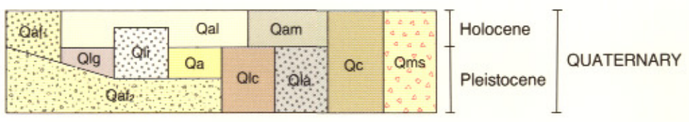
Plate 2
Utah Geological and Mineral Survey Map 107
Geologic Map of the Howell Quadrangle

CORRELATION OF MAP UNITS



Unconformity

Ts — TERTIARY

Unconformity

Pt, Ptc, Pot, PIPob — PERMIAN

Thrust fault

PIPob, IPMmct, IPMmc — PENNSYLVANIAN, MISSISSIPPIAN

Thrust fault

Pzs — MIDDLE PALEOZOIC *

*On cross section only.

DESCRIPTION OF MAP AND CROSS SECTION UNITS

Qal Alluvium—*Silt and sand in active streams and washes.*

Qam Fine-grained alluvium—*Silt and clay in active streams and marshes.*

Qaf1 Younger alluvial-fan deposits—*Sand, silt, and gravel in active alluvial fans.*

Qc Colluvium—*Colluvium of sand and silt.*

Qms Landslide deposits—*Boulders, gravel, and soil displaced downslope by gravity.*

Qli Lacustrine silt—*Silt and clay deposited in Lake Bonneville, commonly calcareous and containing ostracode shells.*

Qlg Lacustrine gravel—*Well-sorted and well-rounded, locally cross-bedded gravel and sand deposited along Lake Bonneville shorelines, including beach, delta, spit, and barrier deposits.*

Qla Undifferentiated lacustrine and alluvial deposits—*Silt and sand of alluvial origin, in part reworked by Lake Bonneville.*

Qlc Undifferentiated lacustrine and colluvial material—*Silt and sand of colluvial origin, in part reworked by Lake Bonneville.*

Qa Older alluvium—*Older deposits of silt and sand, graded to higher lake levels and presently being incised and eroded.*

Qaf2 Older alluvial-fan deposits—*Sand, silt, and gravel in alluvial fans that predate or are contemporaneous with Lake Bonneville deposits. Locally they may include deltaic deposits.*

Ts Salt Lake Formation—*Tuffaceous to calcareous conglomerate and sandstone with local lacustrine limestone beds. Poorly resistant.*

Pt Upper member of Thatcher Mountain Formation—*Thin- to thick-bedded, reddish-brown, fine- to coarse-grained sandstone, locally cross bedded, with interbedded limestone or dolomite.*

Ptc Cherty member of Thatcher Mountain Formation—*Bluish-gray nodular and anastomosing chert replacing and interbedded with fine-grained sandstone, calcisiltite, and dolomite.*

Pot Thinly bedded member of Oquirrh Formation—*Thinly bedded siltstone and calcisiltite with common dark-brown chert lenses.*

PIPob Bioturbated limestone member of Oquirrh Formation—*Light- to medium-gray, silty and sandy limestone and brown, calcareous, very fine-grained sandstone. Bioturbated beds and laminated beds are medium to thickly interbedded.*

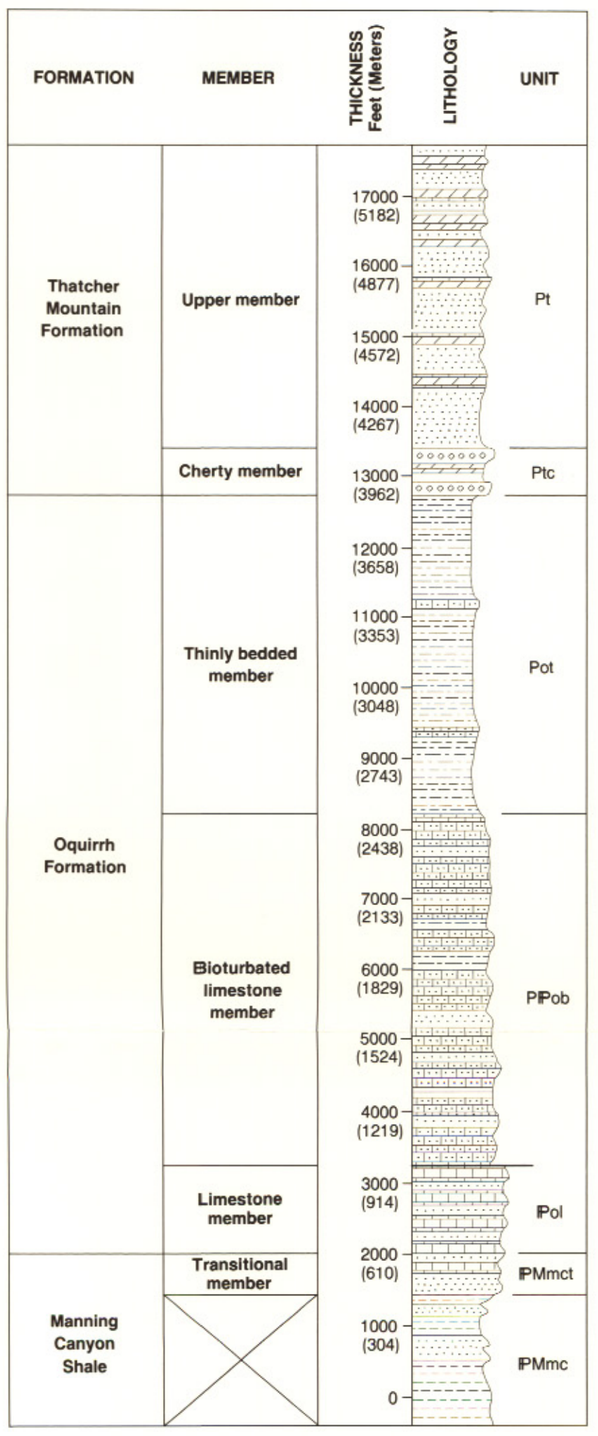
IPol Limestone member of Oquirrh Formation—*Light- to medium-gray limestone and minor brown sandstone in bold exposures. Medium to thickly bedded, with local chert nodules.*

IPMmc Manning Canyon Shale—*Medium- to coarse-grained sandstone and bold, dark-brown quartzite interbedded with non-resistant gray to black shale and minor fossiliferous limestone.*

IPMmct Transitional member of Manning Canyon Shale—*Interbedded tan-weathering quartzite and gray-weathering medium- to thick-bedded bioclastic limestone.*

Pzs Older sedimentary rocks—*Carbonate, sandstone, and shale typical of region. (Cross section only).*

UPPER PALEOZOIC STRATIGRAPHY



MAP SYMBOLS

Contact — *Dashed where location approximate, dotted where covered.*

FAULTS

Dashed where approximate, dotted where covered.

High-angle normal fault — *Bar and ball on downthrown side.*

Low-angle normal fault — *Teeth on downthrown side where exposed.*

Thrust fault — *Teeth on upthrown side; queried where probable.*

STRIKE AND DIP OF BEDDING

Inclined (17) Overturned (75) Vertical Horizontal

Ball indicates that facing direction is determined from outcrop features.

TRACE OF AXIAL SURFACE OF FOLD

Anticline

Syncline

Overturned fold

Direction of plunge indicated.

Plunge and form of small-scale fold

STRIKE AND DIP OF FOLIATION (22)

LOCATION OF PALEONTOLOGICAL SAMPLE (★1)

GEOMORPHOLOGICAL FEATURES

Trace of Bonneville shoreline

Trace of Provo shoreline

(Also serve as unit contacts locally)